PCM3006 Rev B/C Daughtercard
for the
Texas Instruments TMS320C6X11
Digital Signal Processing (DSP) Starter Kit

Educational DSP, LLC

Hardware

The PCM3006 daughtercard is designed to operate on the Texas Instruments TMS320C6211 and TMS320C6711 DSP Starter Kits (DSK). It attaches to the DSK using the Peripheral Interface connector, J3. If desired, ½" stand-offs can be used to affix it to the DSK.

General Precautions

Proper electrostatic discharge (ESD) precautions should be used at all times when handling the PCM3006 daughtercard. Failure to do so may result in damage to the circuitry.

Audio Connections

The audio connectors on the PCM3006 daughtercard are design to accept standard 3.5mm (1/8") stereo mini-plugs carrying line level signals. When inserting plugs into the audio connectors, use your finger to maintain pressure on the rear of the connector housing. Failure to do so may result in damage to the board. The PCM3006 maximum input range is +/- 1V.

Digital Connections

Connector J5 on the PCM3006 daughtercard permits connection to the CNTL0 and STAT0 signals from the DSK expansion connector. Pin 1 (CNTL0) is a digital output, and can be used to provide a synchronization signal for eye diagram displays. Pin 2 (STAT0) is a digital input, and can be used as a hardware input. Revision C boards also include a ground connection on pin 3.

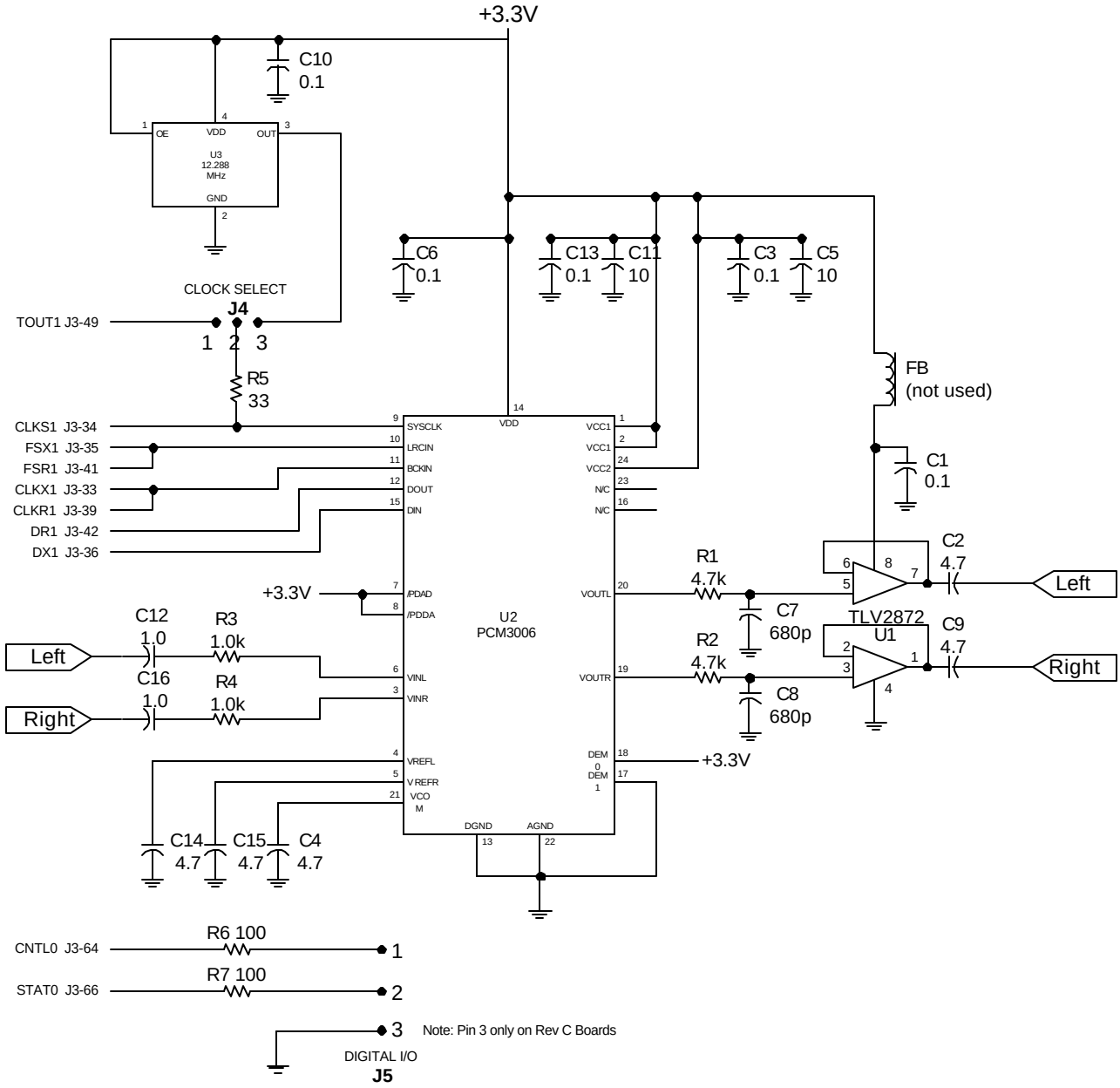
Clock Operation

The PCM3006 codec operates as a slave device, with the DSP serial port providing all required serial communications signals. The DSP serial port does this by using its Sample Rate Generator (SRG) hardware with a master clock input from the daughtercard. The PCM3006 daughtercard can be configured to operate using its 12.288MHz onboard oscillator, resulting in a fixed 48KHz sample rate; or to use variable sample rates. For variable sample rates, the DSP's TIMER1 is used to supply the master clock for the daughtercard. Selection between modes is made using the jumper block J4;

- Shunt between J4-1 and J4-2 - connect the DSK's TIMER1 output as the PCM3006 master clock for variable sample rates.
- Shunt between J4-2 and J4-3 – use fixed 48 KHz sampling rate.

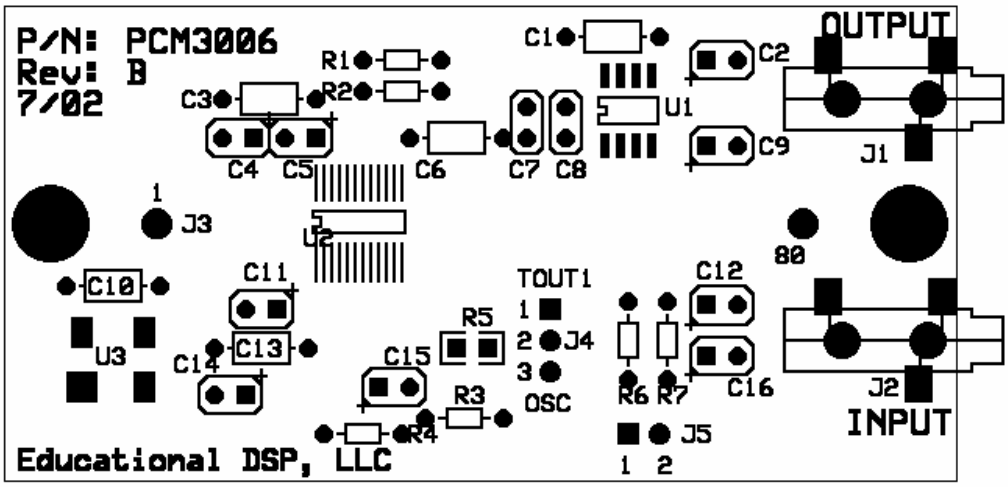
The shunt must be installed in one of the two positions at all times. The range of sample rates over which the PCM3006 will operate is discussed in the PCM3006 datasheet available from Texas Instruments.

Schematic Diagram

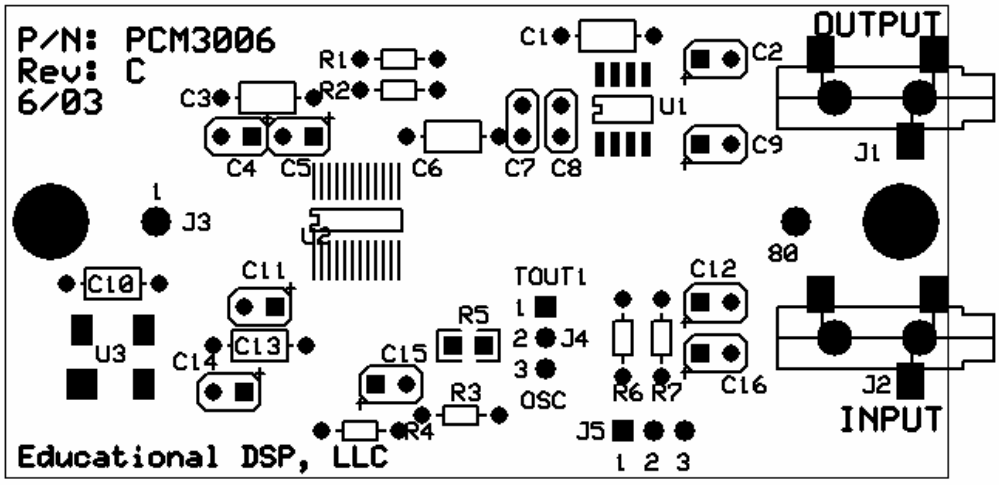


Component Layout

Board Revision B



Board Revision C



Software

The software and documentation files are compressed into a single archive file. When extracting, preserve the directory structure for easier use of the included files.

```
Root -+- pcm3006.pdf (this document)
      |
      +- matlab-----+- pcm3006.out
      |             +- c6x_daq.dll
      |             +- scope2.m
      |             +- Matlab_API.pdf
      |
      +- talkthru --+- talkthru.mak
                    +- lnk.cmd
                    +- talkthru.c
                    +- codec.c
                    +- codec.h
                    +- EMIF_Init.c
                    +- c6211.dsk
                    +- vectors.asm
```

Code Composer Studio

A complete Code Composer Studio (CCS) project is included that echoes the input data to the output lines, swapping the left and right channels every 5 seconds. This project can be used as a basis for developing DSP applications using the PCM3006 daughtercard. Copy all files to the desired directory and compile using CCS.

File	Description
talkthru.mak	Project file.
lnk.cmd	Linker command file for CX11 DSK.
talkthru.c	Main function.
codec.c, codec.h	Source code for initialization and operation of the PCM3006 codec.
EMIF_Init.c	Handles initialization of the EMIF for all C6X DSK variants.
c6211dsk.h	DSK header file.
vectors.asm	Interrupt vector table.

Matlab Interface

The Matlab interface software allows the input data from the PCM3006 daughtercard to be directly imported into Matlab in real-time. There are four files supplied;

File	Description
pcm3006.out	Executable file for PCM3006 daughtercard.
c6x_daq.dll	Matlab interface dynamic link library.
scope2.m	Matlab m-file that demonstrates the use of the Matlab interface to use the PCM3006 daughtercard as a two-channel oscilloscope.
Matlab_API.pdf	Documentation of the Matlab API command usage.

The files pcm3006.out, c6x_daq.dll, and scope2.m must be copied to a directory on the Matlab path. Within Matlab, change to that directory, and run scope2.m.